

AMENDMENT

Serial Number: 10/743,960

Filing Date: 12/22/2003

Title: Hydro-Mechanical Threshing Rotor Control System for an Agricultural Combine

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9. -18. (Canceled).

REMARKS.

Claims 1-8 are pending in the present application. Claims 9-18 were previously canceled.

Interview

The Applicant would like to thank the Examiner for returning the Applicant's telephone calls on July 19, 2005 and his offer to take up the present application out of turn and prepare a Notice of Abandonment right away.

Claims 1-8 are pending in the current Office Action. Claims 1-8 were rejected in the Office Action dated January 4, 2005. No claims are amended herein.

Claim Rejections – 35 USC 103

In the Final Office Action the examiner rejected claims 1, 2 and 4-7 under 35 USC 103(a) as being unpatentable over Mather et al. '757 in view of Caswell '656.

The Examiner also rejected claims 3 and 8 over Mather and Caswell, and further in view of Thibodeau (2,901,051). The applicants respectfully traverse the examiner's rejection of the claims.

Combination of the References Improper

The Caswell and Mather references cannot be combined.

Caswell does not skid steer and is therefore directed to a different art.

First, the Caswell reference does not show a "skid steer" vehicle as the examiner alleges. Caswell is therefore directed to a different art, the art of wheel steering, not skid steering.

It is clear that the Caswell vehicle does not skid steer, since Caswell shows a differential 36 both at the front of his vehicle and at the rear of his vehicle, which prevent skidding of the front wheels with respect to each other in a turn, and skidding of the rear wheels with respect to each other in a turn. Caswell also shows his wheels turning together to the same angle, which would also prevent skidding of the wheels on the left versus the wheels on the right...

Which raises the question, why should the Caswell vehicle skid steer at all? Caswell has, as he represents, a perfectly satisfactory four-wheel-drive four-wheel turning vehicle that has no need to skid steer, and that has been specifically designed with two differentials to avoid skidding altogether. Nowhere does Caswell suggest that his vehicle needs even better turning, or that the method of turning (by steering the wheels) is inadequate by itself and needs to be replaced or supplemented with something else such as skid steering.

Mather is already more maneuverable than Caswell

This points to the second problem with the examiner's rejection: he has identified no teaching to combine the two references. The Examiner finds the teaching in Caswell's mention of "maneuverability". However Caswell is less maneuverable than Mather, and therefore "maneuverability" is not a teaching to combine the two, but a teaching not to combine the two.

The Caswell vehicle uses conventional automotive steering with wheels that pivot about a vertical axis, the wheels on opposite sides of the vehicle being joined with differentials to purposefully prevent any wheel from skidding. Caswell states that he is creating a four-wheel drive" vehicle for use off-road – or at least where clearance from overhanging tree branches is important.

The Mather vehicle, being a work vehicle designed for use in tight spaces at a work site, needs greater low-speed mobility than Caswell provides and therefore replaces the traditional limited mobility steerable wheels of Caswell with rigid, fixed axles with wheels that skid steer.

This provides the Mather vehicle with the ultimate in maneuverability, far beyond that of Caswell, mobility that permits the Mather vehicle to literally "turn on a dime".

Caswell is most definitely inferior in maneuverability to the skid steering of Mather and therefore would not increase the mobility of Mather. Although Caswell teaches improved "maneuverability" as a benefit, it must be understood in the context of the Caswell art, which was the art of standard wheel-turning four-wheel-drive automobiles, and not the art of skid steer work vehicles such as Mather. Considered in the context of the Caswell art, Caswell's vehicle was an improvement on the maneuverability. Caswell does improve maneuverability of skid steer vehicles, however.

Caswell and Mather are directed to different arts

This points to another problem with the examiner's rejection: Caswell and Mather are directed to two different areas of vehicle art. Caswell is directed to high-speed off-road four-wheel-drive vehicles that travel about at relatively high-speed across undulating terrain under trees, and Mather is directed to low-speed work vehicles for use in lifting and carrying things from point-to-point in very small and constricted work sites where the benefit of speed, low-profile, and terrain following is nowhere near as important as extremely high maneuverability and load carrying capability.

Caswell and Mather teach against each other

The references cannot be properly combined because they teach against each other. Caswell teaches a standard automotive drive system with wheel turning and differentials 36 to prevent wheel skidding. Indeed, this *entire suspension system* is what Caswell claims as his invention (see, e.g. Caswell claim 1), and identifies as providing the advantages that the examiner cites as justification for combining the two references.

Mather teaches a vehicle with rigid axles that steers only by skidding. Caswell teaches that his entire drive system with its steerable wheels, use of standard components, central differential, offset engine, and single engine drive is novel and beneficial. These elements in combination are what provide the Caswell vehicle with its novelty and benefits.

None of the Caswell benefits are achieved by using any components of Mather. Caswell and Mather teach against each other.

Combining Caswell and Mather would require reengineering with no expectation of success and would change the fundamental mode of operation of each reference

Caswell teaches traditional automotive turn-steering with traditional no-skid differential and wheels that turn to the same angle to prevent skidding). The Caswell improvement lies in providing the same no-skid steering arrangement not only to the front wheels, but to the rear wheels as well.

This no-skid steering is only provided by coupling the front wheels together with differential 36, and the rear wheels together with another differential 36, wherein the differentials 36, (like all differentials) automatically permit the outside wheels in a turn to rotate faster than the inside wheels and thereby eliminate skidding.

To use a differential, Caswell cannot individually drive the wheels on the left and the right side of his vehicle, but must drive each with a single input: a single drive input to the front pair of wheels (via a differential) and a single drive input to the rear pair of wheels (again, via another differential). There is no way that a Caswell differential-type automotive drive system can drive the wheels on different sides of the vehicle in different directions.

The Mather vehicle, which steers only by skidding, has no means for automatically adjusting wheel speed on both sides of the vehicle such as the Caswell differentials to reduce or

eliminate skidding. Wheels on either side of the Mather vehicle must be driven independently and with skidding in order to skid steer the Mather vehicle.

In order to provide his claimed differential (i.e. nonskid) suspension, steering and drive system with the benefits of increased maneuverability, Caswell cannot provide an independent drive to wheels on the left side and independent drive to wheels on the right side, but must combine wheels on both sides of the vehicle through differential 36.

Differential 36, however, prevents the wheels on both sides of the vehicle from being driven in different directions, and therefore prevents a Caswell-type vehicle from being skid steered.

It would take substantial reengineering that goes beyond either the Caswell or the Mather reference to find a way to make a vehicle that would not change the fundamental mode of operation of either the Mather or the Caswell references to create a system that would (1) provide the skid steering of Mather, as well as (2) provide the nonskid, wheel-turning steering of Caswell. Inserting the steerable hubs of Caswell into the Mather vehicle (as the Examiner suggests) would change the fundamental mode of operation of the Caswell reference.

No Prima Facie Case of Obviousness Has Been Made

Regardless of whether the Caswell and Mather references can be combined, the Examiner has not met his initial burden of making a prima facie case of obviousness since he has not identified any legitimate teaching to combine the two references.

The first teaching the examiner cites for combining the references is "**enhanced maneuverability**". According to the Examiner, the Caswell steering should be added to the Mather vehicle to "further enhance the maneuverability of the [Mather] vehicle by incorporating a steering actuator for four-wheel steering as taught by Caswell.

Caswell teaches enhanced maneuverability, but enhanced maneuverability as compared to what? Caswell is not comparing his vehicle's maneuverability to a skid steer vehicle, since Caswell is working in an entirely different art.

When Caswell mentions "maneuverability" in reference to his claimed suspension system with his four-wheel-drive steering, he is comparing his vehicle to standard four-wheel-drive off-road vehicles. Obviously, adding Caswell's four-wheel steering to a traditional two-wheel steering four-wheel-drive automobile will increase its maneuverability.

Requiring a Mather vehicle to steer by wheel turning or pivoting will reduce the maneuverability of the Mather vehicle. The Mather skid steer vehicle can turn on a dime. The Caswell vehicle, in contrast, requires a turning radius of 5-30 feet like any other wheel turning vehicle.

Hence, the examiner has found no teaching sufficient to support combining the Mather and Caswell references, and therefore has not made a prima facie case of obviousness.

The second teaching the examiner refers to is **"increased traction to enhance the vehicle's terrain versatility"**. Improving the traction of a Mather vehicle is not a benefit to Mather, since Mather must continuously *lose* traction in order to skid steer. If the traction of Mather were increased, Mather would not skid steer at all.

This again points to the inapplicability of combining references from two different art areas. In wheel-turn steering automobile arts, such as Caswell, traction is of central importance since losing traction prevents the vehicle from driving straight, turning accurately and even prevents it from moving, if the wheel losing traction is on ice, for example. With a differential-based system like Caswell, loss of wheel traction can strand the vehicle, as one wheel spins freely and the other just sits there, not running at all. It is only because Caswell is a differential-based wheel turning steering vehicle that traction is an issue.

Furthermore, adding the steerable hubs of Caswell to Mather will not provide Mather with the traction of Caswell, since Mather will still steer by skidding. Thus even if the teaching of Caswell were valid, the proposed modification (in the absence of a total reengineering of the Mather and Caswell drive systems) will not provide the claimed benefits of the Caswell traction to the Mather vehicle at all. Without the Caswell differential and axle arrangement that is necessary to automatically permit the outer wheels to turn without skidding, adding Caswell steerable hubs to Mather provides no increase in traction at all. Furthermore, by making this change to the Caswell suspension system the examiner goes against any alleged Caswell teaching of increased traction. Hence, "increased traction" will not support the combination of these references.

The third teaching cited by the Examiner is the enhanced ability to traverse "undulating terrain". Traversing undulating terrain is a problem for a four-wheel drive vehicle, not for a Mather-type skid steer vehicle intended for use at a job site, and that typically travels at less than about 6 miles per hour as it travels short distances and maneuvers around obstacles and people. Again, Caswell is directed to off-road four-wheel drive type vehicles like Jeeps (not slow work vehicles like Mather) in which traveling over the ground at high speed and maintaining good traction at all times is critical. Furthermore, accommodating undulating terrain does not teach the use of wheel-turning steering such as Caswell uses, since wheel turning does not accommodate undulations (up-and-down movement) of the ground.

Impermissible Hindsight

What the examiner is doing is using impermissible hindsight to extract components from two disparate wheeled vehicles, with two different drive arrangements, two different steering arrangements, from two disparate art areas, neither of which is identified as inadequate or otherwise needing the benefits of the other vehicle, and cobbling them together to create a single vehicle that provides the benefits of neither according to the prior art references identified by the Examiner. The Examiner found the suggestion to combine the two references in the Applicants' own teaching and not in the prior art.

Rejection of Claim 2

Regarding Claim 2, nothing in the Mather or Caswell references teaches or suggests "control arms pivoting about horizontal axes" as recited in claim 2. First, Mather discloses no control arms. Second, while Caswell identifies several structures that (allegedly) connect the wheel hubs to the chassis, none of the structures actually connect to anything.

Caswell describes some of these structures as being connected to the wheel hub by "swivel joints" (page 1, line 95). These devices include an "upper arm 6, a lower arm 8, and as a semi-trailing arm 10" (page 1, lines 85-89).

Nowhere does Caswell illustrate or explain how or where these devices are connected to the chassis of the Caswell vehicle. Since Caswell does not show how the devices are coupled to the chassis, it is entirely unknown how they move, and particularly whether they "pivot about horizontal axes" as recited in claim 2.

Figure 1 of Caswell shows the ends of arms 10 either rigidly fixed to some structure under the vehicle (since the dashed lines terminate abruptly), or not rigidly fixed to the chassis (since the structures may have been removed for ease of illustration, although Caswell does not say so), and terminating somewhere underneath the floor pan of the vehicle with an unknown connection.

Similarly, in Figure 2, Caswell shows arms 6 extending somewhere into the Caswell vehicle where they also are represented by dashed lines that abruptly terminate.

Finally, in Figure 2, Caswell shows arms eight extending under the vehicle and terminating, with what looks to be rounded ends, but no coupling or other constraint to those rounded ends is illustrated.

In view of the above lack of explanation or illustration, one has no idea from the Caswell reference how Caswell intended to constrain the movement of the inner ends of these various arms. Hence Caswell cannot teach any particular movement such as the claimed "control arms pivoting about horizontal axes".

Rejection of Claim 7

Regarding Claim 7, nothing in the Mather or Caswell references teaches or suggests "left front and left rear control arms [] coupled to the left side wall and the right front and right rear control arms [] coupled to the right side wall". Again, for the reasons noted regarding Claim 2 above, the "arms" of Caswell do not appear to be connected to anything yet there in most ends. Whatever structure their connected to remains undescribed and unillustrated.

Secondly, since Caswell has no "sidewalls", one thing Caswell cannot teach is connecting arms to a "left sidewall" or a "right sidewall".

Furthermore, Caswell shows all three Caswell "arms" extending into the Caswell vehicle some distance, both when viewed from the top in FIGURE 1, and when viewed from the front in Figure 2, and does not show them terminating right at the side of the Caswell vehicle. This also suggests that Caswell has no sidewall structure or sidewall connection. See, e.g., the long dashed line portion of each Caswell "arm" 6, 8, and 10 in FIGURES 1 and 2 of Caswell.

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Conclusion

Applicant respectfully submits that claims 1-8 are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at 901-309-3068 to facilitate prosecution of this application.

Respectfully submitted,

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